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### (54) DRIVING METHOD FOR NONVOLATILE SEMICONDUCTOR STORAGE DEVICE

#### (57) Abstract:

**PURPOSE:** To improve number of rewriting times and information holding time by generating substrate hot holes for storing positive charge in a floating gate, and generating drain avalanche hot electrons for storing negative charge.

**CONSTITUTION:** A forward voltage is applied to a pn junction between a P-type semiconductor substrate in and a well 14, and holes 19 to be implanted in an n-well are generated. Simultaneously, a negative voltage is applied to an upper gate electrode 9, a source p<sup>+</sup> type region 15 and a drain p<sup>+</sup> type region 16, a depleted layer 21 is generated, energy of holes 19 is applied, and holes 20 to be implanted in a lower gate oxide film 17, i.e., substrate hot holes are generated from the n-well. Thus, positive charge is stored in a floating gate.

The region 15 is grounded, a negative high voltage is applied to the region 16, and a negative low voltage is simultaneously applied to the electrode 9 to generate drain avalanche hot electrons, thereby storing a negative voltage at the gate.

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